REMARKS

Claims 1, 2 and 11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (U.S. Patent 6,159,823) in combination with Leung et al. (U.S. Patent 4,693,781) and Ghandhi. This rejection is respectfully traversed in view of for the following reasons.

Claim 1 recites "patterning a silicon oxynitride layer; then etching a trench in a semiconductor substrate through the patterned silicon oxynitride layer; then conditioning the patterned silicon oxynitride layer, wherein no wet clean step is performed between the etching of the trench and the conditioning of the patterned silicon oxynitride layer; and then performing a wet clean step in the presence of the conditioned silicon oxynitride layer, wherein the wet clean step cleans the trench in the semiconductor substrate.

As described in the specification, conditioning the patterned silicon oxynitride layer before performing a wet clean step prevents the formation of watermarks.

The Examiner correctly indicates that Song et al. "does not teach the step of conditioning the silicon oxynitride layer after trench formation" as recited by Claim 1.

The Examiner indicates that Leung et al. remedies this deficiency of Song et al. However, Leung et al. also fails to teach the step of conditioning a silicon oxynitride layer after trench formation. In fact, Leung et al. does not mention a silicon oxynitride layer.

The Examiner believes that using the sacrificial oxide 44 of Leung et al. in the process of Song et al. will obtain the advantage of rounding trench corners and having damage free trench walls. However, Song et al. already teaches a thermal oxide layer 125 which "recovers the damage of the substrate 110 and maintains the surface of the substrate 110

to be in a stable bonding ($Si-O_2$) state." (Song et al., Col. 5, lines 43-45.) Song et al. also provides a process "which rounds the upper edge and corners of the trench". (Song et al., Col. 7, lines 5-14; Fig. 11.) Thus, there is no motivation to combine the sacrificial oxide 44 of Leung et al. with Song et al. Moreover, because Song et al. already teaches the use of a thermal oxide layer 125, the sacrificial oxide 44 of Leung et al. would not add to the teachings of Song et al.

In addition, Claim 1 recites "performing a wet clean step in the presence of the conditioned silicon oxynitride layer". (Emphasis added.)

However, Song et al. explicitly states, "Because the [silicon oxynitride] anti-reflection layer pattern 122a is removed during the undercutting process, water spots are not generated even though the cleaning process is later performed". (Emphasis added.) (Song et al., Col. 5, lines 34-36.) Song et al. therefore explicitly teaches that the anti-reflection layer pattern 122a should be removed before the cleaning process in order to eliminate water spots. (See also, Song et al., Col. 5, lines 8-10 and 23-27; Fig. 7.) Thus, Song et al. teaches away from "performing a wet clean step in the presence of the conditioned silicon oxynitride layer" as recited by Claim 1.

The Examiner further states "Ghandhi teaches cleaning surface of semiconductor wafers after each processing step in a fabrication using wet cleaning process." Even if this were true, Ghandhi fails to remedy the above-described deficiencies of Song et al. and Leung et al. In addition, if this were true, Ghandhi would teach away from "no wet clean step is performed between the etching of the trench

and the conditioning of the patterned silicon oxynitride layer" as recited by Claim 1.

For these reasons, Claim 1 is allowable over Song et al. in combination with Leung et al. and Ghandhi.

Claims 2 and 11, which depend from Claim 1, are allowable over Song et al. in combination with Leung et al. and Ghandhi for at least the same reasons as Claim 1.

Claims 3 and 4 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. in combination with Leung et al. and Ghandhi, and further in view of Ballatine et al. (U.S. Patent 6,417,070). This rejection is respectfully traversed for the following reasons.

As described above, amended Claim 1 is allowable over Song et al. in combination with Leung et al. and Ghandhi. Ballatine et al. does not overcome the above-described deficiencies of Song et al., Leung et al. and Ghandhi. Thus, Claims 3 and 4, which depend from Claim 1, are allowable for at least the same reasons as Claim 1.

Claims 12-17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. in combination with Leung et al. and Ghandhi, and further in view of Ballatine et al.. This rejection is respectfully traversed for the following reasons.

As described above, amended Claim 1 is allowable over Song et al. in combination with Leung et al. and Ghandhi. Ballatine et al. does not overcome the above-described deficiencies of Song et al., Leung et al. and Ghandhi. Thus, Claims 12-17, which depend from Claim 1, are allowable for at least the same reasons as Claim 1.

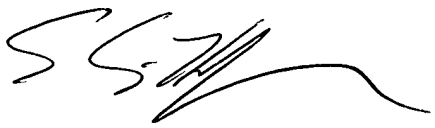
Claims 18 and 19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. in combination with Leung et al. and Ghandhi, and further in view of Applicants Admitted Prior Art (AAPA). This rejection is respectfully traversed for the following reasons.

As described above, amended Claim 1 is allowable over Song et al. in combination with Leung et al. and Ghandhi. AAPA does not overcome the above-described deficiencies of Song et al., Leung et al. and Ghandhi. Thus, Claims 18 and 19, which depend from Claim 1, are allowable for at least the same reasons as Claim 1.

CONCLUSION

Claims 1-4 and 11-19 are pending in the present application. Reconsideration and allowance of these claims is respectfully requested. If the Examiner has any questions or comments, he is invited to call the undersigned at (925) 895-3545.

Respectfully submitted,



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